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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/826,274	04/04/2001	Joseph C. Olson	V0077/7154	2953

7590 07/12/2004  
Gary L. Loser  
Varian Semiconductor Equipment Associates, Inc.  
35 Dory Street  
Gloucester, MA 01930

EXAMINER

DONG, DALEI

ART UNIT	PAPER NUMBER
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2879

DATE MAILED: 07/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/826,274

Applicant(s)

OLSON ET AL

Examiner

Dalei Dong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12 and 21 is/are allowed.
- 6) ☒ Claim(s) 1-11, 13, 14, 17-20 and 22-25 is/are rejected.
- 7) ☒ Claim(s) 15 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Allowable Subject Matter***

1. The indicated allowability of claims 13 and 14 is withdrawn in view of the newly discovered reference(s) to U.S. Patent No. 4,339,691 to Morimiya. Rejections based on the newly cited reference(s) follow.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-5, 8-11, 13, 14, 17-20 and 22-25 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 4,339,691 to Morimiya.

Regarding to claim 1, Morimiya discloses in Figure 5, column 4, lines 1-60, a cathode sub-assembly for a ion source comprising: an indirectly heated cathode (47) and a support rod (45 and 46) fixedly attached to the indirectly heated cathode (47) for supporting the cathode with an arc chamber (2) of the ion source.

Regarding to claim 2, Morimiya discloses in Figure 5, the support rod is attached to a surface of the cathode facing away from the arc chamber.

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Regarding to claim 3, Morimiya discloses in Figure 5, the cathode is in the shape of the disk.

Regarding to claim 4, Morimiya discloses in Figure 5, the support rod is fixedly attached at or near the center of the cathode, along an axis of the cathode.

Regarding to claim 5, Morimiya discloses in Figure 5, the support rod is in the shape of a cylinder and the diameter of the cathode is larger than the diameter of the support rod.

Regarding to claim 8, Morimiya discloses in Figure 5, the support rod mechanically supports and conducts electrical energy to the cathode.

Regarding to claim 9, Morimiya discloses in Figure 5, column 4, lines 1-60, a cathode sub-assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing (2) that defines an arc chamber, comprising: a cathode sub-assembly, including a cathode (47) and a support rod (45 and 46) fixedly mounted thereto; a filament (38) for emitting electrons, that is positioned outside the arc chamber (2) in close proximity to the support rod of the cathode sub-assembly; and a cathode insulator (41) for electrically and thermally isolating the cathode from an arc chamber (2) housing, that is disposed around the cathode of the cathode sub-assembly.

Regarding to claim 10, Morimiya discloses in Figure 5, a filament (38) disposed around the support rod (45 and 46) in close proximity to the cathode (47) and isolated from the plasma in the arc chamber (2).

Regarding to claim 11, Morimiya discloses in Figure 5, a filament (38) disposed around the support rod (45 and 46) in close proximity to the cathode (47) and isolated from a plasma in the arc chamber (2), wherein the filament (38) is fabricated of an electrically conductive material and includes an arc-shape turn having an inside diameter greater than or equal to the diameter of the support rod (45 and 46).

Regarding to claim 13, Morimiya discloses in Figure 5, column 4, lines 1-60, a cathode assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing (2) that defines an arc chamber, comprising: a cathode sub-assembly, including a cathode (47) and a support rod (45 and 46) fixedly mounted thereto; a filament (38) for emitting electrons, that is positioned outside the arc chamber (2) in close proximity to the support rod (45 and 46) of the cathode sub-assembly; a cathode insulator (41) for electrically and thermally isolating the cathode from an arc chamber housing (2), that is disposed around the cathode of the cathode sub-assembly; wherein said cathode insulator (41) includes an opening having a diameter that is larger than or equal to the diameter of the cathode.

Regarding to claim 14, Morimiya discloses in Figure 5, a vacuum gap is provided between the cathode insulator and the cathode to limit thermal conduction.

Regarding to claim 17, Morimiya discloses in Figure 5, a method of supporting and indirectly heating a cathode of an ion source comprising steps of supporting the cathode (47) by a rod (45 and 46) fixedly attached to the cathode; and bombarding the cathode with electrons.

Regarding to claim 18, Morimiya discloses in Figure 5, column 4, lines 1-60, a cathode assembly for an ion source comprising: a cathode (47); a support rod (45 and 46) fixedly attached to the cathode; a cathode insulator (41) for electrically and thermally isolating the cathode from an arc chamber housing (2); and an indirect heating device (38) for indirectly heating the cathode.

Regarding to claims 19, 20, 22, 23 and 24, the method of forming the device is not germane to the issue of patentability of the device itself. Therefore, these limitations have not been given patentable weight.

Regarding to claim 25, Morimiya discloses in Figure 5, column 4, lines 1-60, a cathode sub-assembly for an ion source comprising: an indirectly heated cathode (47) and a support rod (45 and 46) press fitted to the indirectly heated cathode (47) for supporting the cathode within an arc chamber (2) of the ion source.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 6 and 7 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,339,691 to Morimiya in view of U.S. Patent No. 4,783,595 to Seidl.

Regarding to claim 6, neither Morimiya nor Seidl discloses the diameter of the cathode is at least four times larger than the diameter of the support rod. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have adjust the diameter of the support rod in accordance to the cathode, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding to claim 7, Morimiya discloses the claimed invention except a spring loaded clamp for holding the support rod.

Seidl teaches in Figure 1, column 8, lines 28-55, a spring loaded clamp (7) for holding the support rod.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the spring loaded clamp of Seidl for the cathode sub-

assembly of Morimiya in order to exert an compression force to keep the cathode tightly fixed within the recess and further provided improved and reliable electrical contact.

***Allowable Subject Matter***

6. Claims 12 and 21 are allowed.
7. The following is an examiner's statement of reasons for allowance: the prior art of record taken alone or in combination fails to teach or suggest a cathode assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing (2) that defines an arc chamber, comprising: a cathode sub-assembly, including a cathode (47) and a support rod (45 and 46) fixedly mounted thereto; a filament (38) for emitting electrons, that is positioned outside the arc chamber in close proximity to the support rod of the cathode sub-assembly; and a cathode insulator (41) for electrically and thermally isolating the cathode (47) from an arc chamber housing (2), that is disposed around the cathode (47) of the cathode sub-assembly; and a filament (38) disposed around the support rod (45 and 46) in close proximity to the cathode and isolated from a plasma in the arc chamber (2), wherein the filament is fabricated of an electrically conductive material and includes an arc-shaped turn having an inside diameter greater than or equal to the diameter of the support rod, and wherein a cross-sectional area.

The prior art of record teaches a cathode assembly for use in an indirectly heated cathode ion source which includes an arc chamber housing that defines an arc chamber, however prior art of record filament is fabricated of an electrically conductive material

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and includes an arc-shaped turn having an inside diameter greater than or equal to the diameter of the support rod, and wherein a cross-sectional area in order to efficiently facilitate the discharge.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Claims 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record taken alone or in combination fails to teach or suggest cathode insulator includes a flange in order to shield the sidewall of the cathode insulator from a plasma in the arc chamber.

#### ***Response to Arguments***

9. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of a cathode assembly.

U.S. Patent No. 4,301,391 to Seliger.

U.S. Patent No. 5,008,585 to Bernardet.

U.S. Patent No. 5,315,121 to Klug.

U.S. Patent No. 5,886,355 to Bright.

U.S. Patent No. 6,356,026 to Murto.

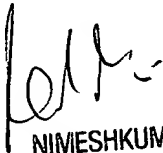
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (571)272-2370. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar Patel can be reached on (571)272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 1, 2004

  
NIMESHKUMAR D. PATEL  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800